

IDA PAPER P-3122

THE CHANGING NATURE OF
THE INTERNATIONAL ARMS MARKET

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March 1996

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19960802 005



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PREFACE

This paper prepared as a Central Research Project assesses how the post-Cold War international arms market is changing in revolutionary ways. It begins by describing the impetus for many of the in-progress structural and operational changes now sweeping the international arms market. Next, it identifies and describes some emerging trends that spring from the changing context within which weapons exporters operate. Finally, it explores the strategic implications of some of these developments for the future development, production, and operation of weapons.

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KEY FINDINGS

- The international arms market is undergoing revolutionary changes which have profound implications for the way weapons are produced, sold, and operated.
- Increasingly sophisticated defense and dual-use products are being offered on the international arms market to virtually any nation which can afford them.
- Technology and arms transfer controls are becoming less effective. At the same time, black and grey market arms sales are becoming increasingly important sources of weapons to states denied access to overt sources.
- Instead of buying new equipment, many economy-minded nations are looking to modernize existing equipment through upgrade packages.
- Hybridizing weapons, by combining the best features of East and West, is becoming increasingly common.
- Defense firms are more frequently entering strategic, transnational business alliances for technical, financial, and competitive reasons. The result is a globalization of the development and production process.
- There is growing direct access to technical know-how by hiring out-of-work defense specialists directly and by renting foreign RTD&E facilities to test and develop weapons systems.
- Defense firms are going through a period of radical restructuring and rationalization. This process includes: (1) reducing the total number of firms producing defense products, (2) downsizing the overall defense work force, and (3) privatizing defense production.
- Producers are responding to a more competitive market by devising innovative approaches to financing deals.
- Arms transfer decisions are increasingly seen in economic rather than national security terms. Indeed, arms are becoming just one more commodity in the perpetual struggle to gain a positive balance of trade.
- The radical and wide-ranging changes now sweeping the international arms market will eventually result in a far different sort of market from the one of the Cold War years.

A. INTRODUCTION

The international arms market is undergoing revolutionary changes which have profound implications for the way weapons are developed, produced, and operated. These changes also have significant implications for regional military balances and for the ability of Western nations to intervene in regional trouble spots at low cost. This process began four years ago with the end of the Cold War, but has yet to run its course.

The following discussion will examine several major themes associated with the radical changes that are now in the process of reshaping the international conventional arms market. We will begin by describing the impetus for many of the in-progress structural and operational changes. Next, we will identify and describe some emerging trends that spring from the changing context within which weapons exporters operate. Finally, we will assess the strategic implications of these developments.

B. THE CHANGING INTERNATIONAL CONTEXT

The end of the Cold War brought drastic decreases in the Western and former Soviet defense budgets. In the United States, the Pentagon has terminated 20 major weapons programs since 1991, and overall procurement expenditures have declined a staggering 71% since the height of the Reagan defense build-up in fiscal 1985.¹ This marks the lowest U.S. investment in new military hardware (as measured by percentage of the defense budget) since 1940.² Post-Cold War Russian defense procurement has also declined a dramatic 80% since 1990 according to Russian Ministry of Defense statistics.³ Other major arms producers like Britain, France, Germany, South Africa, and Israel also experienced similarly precipitous declines in state orders for military equipment.

Interest in defense conversion was the initial response to the significant downturn in domestic defense procurement budgets. Unfortunately, the promise of defense conversion proved largely illusionary for both the West and the former Soviet Union.⁴ Advocates of this process grossly underestimated the amount of capital required for retooling defense lines. (For example,

¹ John D. Morrocco, "Tight Budgets Force Innovative Strategies," *Aviation Week & Space Technology*, March 13, 1995, p. 55.

² Bruce D. Nordwall, "Studies Raise Red Flag on Hardware Spending," *Aviation Week & Space Technology*, March 13, 1995, p. 28.

³ Wendy Sloane, "Russian Ex-Weapons Factory Learns That Best Defense Is in Motorcycles, Not Missiles," *The Christian Science Monitor*, May 11, 1995, p. 7.

⁴ *Backgrounder on the U.S. Defense Industry in 1994: A Year-End Review*, the Defense Budget Project, February 21, 1995, p. 1.

Russian defense industrialists estimated that conversion would require \$150 billion.⁵) There were also structural impediments to conversion; e.g., defense industries employ far more engineers and technical specialists as a percentage of the total work force than do their civilian counterparts. In other cases, the nature of product lines and the preference of some managers to work on defense projects made conversion unattractive. Thus even after conversion, many firms still had the wrong skill mix to compete in the civilian marketplace.

Declining domestic defense budgets coupled with the general failure of defense conversion efforts had dire economic consequences. The Russian Ministry of Economics, for example, estimates that two million employees have left the defense industry since 1991 and that a further 500,000 will depart in 1995.⁶ Russia is not alone in this predicament. America has lost 40% of its defense industrial jobs over the last five years.⁷ Similarly, approximately one quarter of the defense workers in the Ukraine were laid off in 1992, while British defense employment declined by 36% between 1988 and 1993.⁸ Likewise, employment in the French aerospace industry has declined 27% since its high in the late 1980s.⁹

It is not simply a problem of jobs being lost in the defense sector. In many countries, these workers have few opportunities to move elsewhere or to do so at comparable wage rates. The problem is particularly troublesome for Russia, where 74 cities have 80% of the workforce dependent on the defense sector. In these cities there is little alternative work. Even worse, workers in Russia depend upon their employers for apartments, medical care, and sometimes the main meal of the day. Also because of severe housing shortages throughout Russia it is difficult for displaced workers to go elsewhere in search of employment. Press reports also paint a dismal picture of the fate of displaced U.S. aerospace workers and their struggle to maintain their standard of living in the face of massive layoffs.¹⁰

Increasingly, governments and defense industries are turning to the international arms market for salvation. The head of the state-run company Armscor predicts that South Africa's

⁵ Mark Galeotti, "The Russian Arms Bazaar," *Jane's Intelligence Review*, November 1992, p. 490.

⁶ Julian Cooper, "Demilitarizing the Russian Defence Economy," *Security Dialogue*, Vol 26, No. 1, 1995, p. 38.

⁷ "The Shrinking Defense Economy," *The Washington Post*, July 16, 1995, p. C6.

⁸ Michael J. Barry, "Privatization, Conversion, and Restructuring in Russia's Military-Industrial Complex: Macroeconomic Implications of a Sector Set Apart," *Comparative Strategy*, Vol. 13, 1994, p. 420. Malcom Rifkind, "Global Teaming Crucial to Future," *Aviation Week & Space Technology*, May 29, 1995, p. 54.

⁹ Pierre Sparaco, "Harsh Reality Looms For French Aerospace," *Aviation Week & Space Technology*, September 4, 1995, p. 38.

¹⁰ For a particularly poignant and personal account of this situation see David Beers, "The Crash of Bluesky California: The Aerospace Industry Is Dying and With It A Way Of Life," *Harper's*, July 1993, pp. 68-73.

defense industry will be "increasingly driven" by exports.¹¹ Indeed, South Africans estimate that slightly over 50% of defense industry jobs are now tied directly to exports.¹² In Poland, defense workers demonstrated around the country to demand that their government do more to increase weapons exports to offset declining domestic orders.¹³ In a similar vein, newspaper reports indicate that Japan's main defense industrial federation (Keidanren) recently sent a strong message to their government: Japan's defense contractors want to export.¹⁴ Doing so would mark a significant departure from long-standing Japanese policy. Also in contravention of past policy, Israel is prepared to export defense products to Muslim countries in the Persian Gulf and Asia as well as to Jordan and Turkey.¹⁵ The Ukrainians are even more blunt about the need to export. According to one defense industrialist, the Ukraine "is ready to sell anything, even its soul to the devil" to stave off economic collapse and social unrest.¹⁶

What is true for these smaller producers is doubly true for their larger U.S., Russian, and Western European counterparts. As the Russian Deputy Prime Minister remarked last year in Malaysia, Russia is "willing to sell anything that our customers want, except nuclear weapons."¹⁷

Indeed, exports now equate to survival for many firms. The defense component of British Aerospace, for example, admits that 83% of its products go abroad. Israeli Aircraft Industries exports 80% of its output. Even the President of Lockheed Martin's Tactical Aircraft Systems estimates that up to 88% of future F-16 sales will be to foreign customers.¹⁸

The importance of exports to Russian defense industry is probably best illustrated by the case of MiG aircraft. In 1995, only 35 MiG-29 fighters were produced—all of which went to foreign customers (10 for Hungary, 7 for Slovakia, and 18 for Malaysia).¹⁹

Coincidentally with this new emphasis on exports, many Third World states concluded that they needed to upgrade their military capabilities. In part, this desire to modernize was driven by

11 Paul Taylor, "South Africa To Expand Arms Sales," *The Washington Post*, May 27, 1994, p. 27.

12 Ibid., p. 27.

13 Raymond Bonner, "Iran Buying 100 Tanks From Poland," *New York Times*, May 17, 1995, p. 3.

14 "Slow Seppuku," *The Economist*, June 10, 1995, p. 58.

15 Sharone Parnes, "Diplomatic Success Opens Door for Israeli Exports," *Defense News*, June 26-July 2, 1995, p. 16.

16 Taras Kuzio, "Ukraine's Arms Exports," *Jane's Intelligence Review*, February 1994, p. 65.

17 Richard Beeston, "Kremlin's Arms Salesman Return to the Offensive," *The [London] Times*, June 16, 1994, p. 11.

18 "Lockheed Martin Says It Will Stay In Fighter Business For Long Term," *ShowNews*, Aviation Week Group, June 12, 1995, p. 77.

19 Nikolay Novichkov and Craig Covault, "New Russian MiGs Set For Flight Test," *Aviation Week and Space Technology*, January 1, 1996, p. 21.

the perception that another nation in the region was significantly increasing its capabilities. For example, several East Asian nations have recently responded to growing Chinese military strength by buying advanced Western and Russian military equipment.²⁰ Russian commentators have dubbed this phenomenon the "domino effect," whereby the sale of several dozen weapons systems creates a new market in a neighboring country in response.²¹

Many nations have also come to believe, as a consequence of the easy allied victory over Iraq in the Gulf War, that qualitative advantages and force multiplying technologies are becoming increasingly important in war; indeed, they may even constitute a revolution in military affairs.²² The effectiveness of well-integrated, high-intensity operations in the Persian Gulf War came as a "deep psychological shock" to Chinese commanders according to one Chinese defense official.²³ The quick dismemberment of the Iraqi Army in 1991 "had a devastating impact on Chinese force planning" according to a second Chinese defense official.²⁴ And finally, the sustained economic growth of a few states (e.g., the "Asian Tigers" and China) now makes defense modernization feasible.

International control mechanisms are breaking down at the same time that the pressure to export is increasing. COCOM, the international coordinating committee to control the export of defense-related technologies, was disbanded in March 1995. At the same time, many supplier nations have become unwilling to report all conventional arms transfers to the United Nations registry officials. This is because of customer pressure to keep the nature and quantitative extent of their modernization programs secret from regional rivals. Other approaches to controlling the spread of advanced weapons have also experienced problems. The Missile Technology Control Regime, for instance, did not stop 35 Western European and American companies from supplying assistance to Iraq's SCUD missile program.

²⁰ "Singapore Leader Cites Anxiety Caused by China's Arms Buildup," *Boston Globe*, May 14, 1995, p. 11. Edward Luce, "Manila Ready to Go Shopping for \$2bn of Arms—Startled by China's Action in the Spratlys, the Philippines Plans a Spending Spree," *London Financial Times*, July 24, 1995, p. 3.

²¹ Nikolay Kuchin, "Arms", "Roosvooruzheniye: A dangerous, Lucrative Location", "You Need to See Yesterday and Pay Taxes Today", *Novoye Vremya*, June 1995, No. 22, pp. 32-33 as translated in JPRS-UMA-95-025, June 20, 1995, p. 30.

²² David C. Isby, "The Market for Combat Aircraft in Asia," *Military Technology*, Vol 18, No. 2, 1994, pp. 10.

²³ David A. Fulghum, "New Chinese Fighter Nears Prototyping," *Aviation Week & Space Technology*, March 13, 1995, p. 26.

²⁴ *Ibid.*, p. 26.

Even explicit international arms embargoes are not ironclad. Consequently, stories of leakage are pervasive in the press.²⁵ A spectacular example of this phenomenon is the interception by Jordanian authorities of "very sophisticated" missile-guidance components bound for Iraq late in 1995.²⁶

C. MARKET SIZE

Despite the increasing availability of weapons, overall international sales declined sharply from an estimated high of \$71 billion in 1985 to a low of \$20 billion in 1992.²⁷ According to defense trade journals, the international market then rebounded to about \$25.4 billion in 1994.²⁸ If these estimates are correct, the international arms market has bottomed out and is now rebounding. Such an interpretation of events seems to be borne out by the 1995 Paris Air Show, where many major aerospace firms professed the belief that the worst was over and that more stable (and acceptable) conditions would prevail over the next decade. Such optimism at Paris is especially significant given the general pessimism that pervaded the Farnborough Air Show just nine months before Paris.

While it is clear that the international market has declined dramatically since the halcyon days of the mid-1980s, it is impossible to estimate overall sales volume for any one year accurately. For one thing (as will be discussed later in detail), black and grey market sales may run anywhere from two to five times legal sales in some countries. Also, not every country publicly reports all sales. Last year, France did not report 50% of its foreign sales until almost the end of the year. This meant that the French share of the total international market was really 14% rather than the publicly accepted figure of 7%. More recently, Iraqi defector Lt. Gen. Hussein Kamel Majid announced that Iraq was negotiating the purchase of 4,000 tanks from Russia—something Russian officials denied.

The other difficulty in accurately assessing total international market size is that published figures include only cash transactions. Doing so seriously underestimates the total market because of the innovative ways in which many arms deals are now being financed. (This issue will be discussed later in more detail.) Weapons are now traded for debt forgiveness. Weapons are also being bartered for other products like consumer goods, food, or oil. In some cases, suppliers are willing to delay payment for as much as several years, as Israel recently did for Cambodia.

²⁵ To better understand the difficulty in controlling defense technology transfers, see Duncan Clarke, "Israel's Unauthorized Arms Transfers," *Foreign Policy*, Summer 1995, pp. 89-104.

²⁶ "Jordan Seizes Missile Parts Meant for Shipment to Iraq," *The Washington Post*, December 8, 1995, p. 44.

²⁷ "Global Arms Sales Show Decline," *Arms Control Today*, May 1994, p. 22.

²⁸ Barbara Starr, "France Comes First In 'Third World' Market," *Jane's Defence Weekly*, August 19, 1995, p. 17.

For the purposes of this paper, precise market size is irrelevant. More importantly, it is clear that the market is: (1) significantly smaller than before, (2) unlikely to regain the high sales volume of the mid-1980s, and (3) still sufficiently large to encourage traditional arms producers to emphasize exports. For all of these reasons, the international arms market should be extremely competitive for exporters and consequently provide potential buyers with negotiating leverage over price and level of the technology embedded in their potential purchases.

D. EMERGING TRENDS

1. Rationalizing the Arms Industry

Drastic reductions in military orders from American, Russian, and Western European governments have resulted in significant overcapacity for arms makers worldwide. The defense segment of the U.S. aerospace sector, for example, currently has two-thirds more capacity than it needs.²⁹ To meet this crisis, defense firms are going through a period of radical restructuring and rationalization.

Consolidation, especially among American defense firms, is a hallmark of this restructuring process. The management consulting firm of Booz Allen and Hamilton predicts that as many as 80 of the top 100 American defense contractors will disappear by the year 2000.³⁰ Some will collapse, others will acquire a larger share of the shrinking defense market by acquiring other firms' existing military orders, and still others will sell their defense business to raise capital to go into civilian ventures. Lockheed's purchase of Martin Marietta and General Dynamics' military aircraft line is a striking example of the first strategy. General Electric chose the second course when it sold off its entire defense product line.

The process of consolidating arms production into fewer and fewer hands increased dramatically beginning in 1994.³¹ In that year, more than a dozen major mergers and acquisitions took place.³² As a result, only one or two American firms still produce jet fighters, main battle tanks, armored vehicles, and space-launch vehicles.

Consolidation offers the promise of greater efficiency and productivity through downsizing while still retaining the remaining domestic military orders. For example, Hughes Aircraft consolidated five major missile plants into one after acquiring General Dynamics' tactical missile

²⁹ Norman R. Augustine, "Waging Peace," *U.S. Naval Institute Proceedings*, May 1995, p. 47.

³⁰ "Lock and Load: The Pentagon Vs. The Trustbusters," *Business Week*, January 31, 1994, p. 41.

³¹ "Backgrounder on the U.S. Defense Industry in 1994: A Year-End Review," *op. cit.*, p. 3.

³² *Ibid.*, p. 3.

division.³³ Such downsizing produces dramatic results. Worker productivity after consolidation rose from \$137,200 per defense sector employee in 1990 to \$153,300 in 1994.³⁴ Such increased efficiency means lower production costs which offer U.S. firms an important advantage in today's highly competitive international market.

Western Europe would also like to adopt the American consolidation strategy, but it is severely hampered by political constraints.³⁵ Europe is a patchwork quilt of different armed forces with different requirements and commitments to having a national defense industry supply their needs. The problem of consolidation is further complicated by the fact European defense producers are a mix of public and private companies. In this environment, consolidation may mean that one nation no longer has any domestic capability to develop and produce a particular type of weapon—something which is unthinkable to many nationalistic politicians.

On again/off again German and French efforts to unite their efforts in the military space business is an instructive example of the difficulties consolidation efforts face in Western Europe. Germany's participation in the remote military sensing business apparently depends upon cooperation with France. Conversely, continued French involvement in the military space market probably depends on getting the Germans to become partners. In an unusually candid official report, Arthur Praecht of the French National Assembly said that Europe's future in space depended upon Franco-German cooperation³⁶—that is, French technology and German money.

Achieving a common, consolidated effort has, so far, been elusive. The French worry that partnership will result in Germany stealing its technological "crown jewels."³⁷ Also there is fear that cooperation with other European nations (e.g., Matra's cooperation with Britain) will be undermined by too strong Franco-German ties.³⁸ Finally, Germany will have to dig deeply to find the money necessary to participate in the very competitive, high stakes military space business at a time of budgetary woes.

³³ Sandra I. Meadows, "Feverish Merger, Acquisition Drills Spawn Megaweapons Supermarkets," *National Defense*, May/June 1995, p. 25.

³⁴ "Backgrounder on the U.S. Defense Industry in 1994: A Year-End Review", op. cit., p. 5.

³⁵ "Drive to Create Order Out of Chaos," *Financial Times*, February 27, 1995, p. 15.

³⁶ Joseph Fitchett, "Paris Looks to Boon to Get an Ambitious Spy Satellite Program Off the Ground," *International Herald Tribune*, June 12, 1995, p. 13.

³⁷ Ibid., p. 13.

³⁸ Ibid., p. 13.

Despite these obstacles, European firms have begun to take some tentative steps towards consolidation and rationalizing production. British Aerospace, for example, is close to a deal with Matra of France to merge the two companies' tactical missile activities.³⁹ This process has taken nearly two years of hard bargaining and may still not be complete. Daimler-Benz Aerospace and Aerospatiale are in similar talks.

Russia is even slower in consolidating and restructuring its defense producers. In fact, Russian government policies have resulted in the retention of an "excessively large, privileged defense industry in comparison to the country's economic potential, procurement requirements, and ability to tap a shrinking international arms market."⁴⁰ The maintenance of these large defense enterprises perpetuates serious inefficiencies.⁴¹

Rationalization also involves significantly streamlining the work force to reflect market demands and the administrative efficiencies inherent in consolidated operations. Downsizing, if managed correctly, has important implications for corporate profitability. British Aerospace, for instance, reduced the work force from 48,000 to 31,000 over the past five years.⁴² At the same time, its sales per employee rose 50%.⁴³

Russian defense industries are also reducing manpower levels by a combination of layoffs, furloughs, and shortened workweeks. Reduced labor forces should be doubly effective in prompting industrial efficiency in Russian defense plants given the heavy overstaffing that occurred because of Soviet "full employment" policies.

Arms makers are also beginning to rationalize their operations by retaining core competencies and outsourcing activities where they believe they have little or no competitive advantage. For example, Russia recently offered India the chance to make and sell spare parts for MiG aircraft to Third World states. Likewise, Mil Helicopter outsourced foreign maintenance of all its products (including military helicopters) to an American firm. Russia, long regarded as a poor provider of post-sale servicing and repair, greatly improved the attractiveness of its products in the marketplace by outsourcing these functions to reliable foreign surrogates. Argentina also went down this path when it recently paid Lockheed Martin \$200 million to run Argentina's main

³⁹ Ibid., p. 15.

⁴⁰ Barry, *op. cit.*, p. 426.

⁴¹ Ibid., p. 426.

⁴² "Drive to Create Order Out of Chaos," *op. cit.*, p. 15.

⁴³ Ibid., p. 15.

military aircraft repair, maintenance, and overhaul center.⁴⁴ According to press accounts, Western defense industries have also "struck pay dirt" in the form of equipment service contracts with Persian Gulf states.⁴⁵

The last major feature of industry restructuring is privatization. Many Western European and all Russian and Eastern European defense firms were state owned five years ago. That is changing dramatically. According to a 1993 Presidential decree, 75% of Russian defense industry is slated for some form of privatization.⁴⁶ By 1994, 63% of Russian defense enterprises had become joint stock companies and they, in turn, accounted for more than 50% of Russia's defense industrial output.⁴⁷ The more conservative recently elected French government has also decided to divest itself of defense giants like Aeospatiale, SNECMA, and GIAT Industries.

2. Increasingly Sophisticated Offerings

An increasingly wide array of ever more sophisticated defense and dual-use products are being offered in the international arms market to virtually any nation that can afford them. Flourishing black and grey markets offer an alternative for those denied defense products from more conventional sources.⁴⁸ Indeed, virtually any type of weapon, save weapons of mass destruction and long-range ballistic missiles, is available somewhere in the international arms market if the price is right.

One of the big changes in the international arms market is that nations are no longer offering stripped down export versions of top-of-the-line equipment like aircraft and armored vehicles. Now suppliers are offering state-of-the-art electronics, optics, and munitions to potential buyers to gain a competitive advantage over rival firms. For example, the Russians are offering the Zhut (Beetle) radar from Phazotron on MiG-29s to foreign customers, even though this radar is not yet in service with the Russian Air Force. Similarly, posters at the 1995 International Defense Exhibit (IDEX) in the United Arab Emirates (UAE) indicated that a French-German-Russian consortium will soon make an active tank defense system available to foreign customers.

⁴⁴ William R. Long, "Lockheed Martin to Manage Argentine Military Aircraft Center," *Los Angeles Times*, June 22, 1995, p. B-6.

⁴⁵ John G. Roos, "US Combat Gear Ready In Kuwait," *Armed Forces Journal*, March 1995, p. 17.

⁴⁶ Barry, op. cit., p. 421.

⁴⁷ Ibid., p. 425.

⁴⁸ See Duncan Clarke, op. cit., as well as Fred Barbas, "Arms Deal Scandal Roils London Politics," *The Washington Post*, June 20, 1995. Lynne Duke, "Arms Deals by S. Africa Detailed: Report Cites Series of Illicit Sales," *The Washington Post*, July 26, 1995.

Additionally, placards at the 1993 Moscow Air Show advised would-be purchasers that the Russians were willing to configure export aircraft to the buyer's specifications.

This trend is particularly well illustrated in the competition to win the UAE's upcoming purchase of up to 80 strike fighters worth approximately \$8 billion—a competition now being billed as the "sale of the century." Russia is offering the advanced Su-35 aircraft coupled with its most advanced air-to-air missile, the AA-12.⁴⁹ France has countered by offering the Rafale (still in the prototype stage) equipped with its best MICA air-to-air missile.⁵⁰

Because many customers are offering hard cash to acquire foreign weapons (as opposed to accepting foreign military credits, foreign aid, or low-interest loans from the seller as in the past), they can now demand the best even if it is not proffered by the seller. Indeed, customers now enjoy considerable leverage in the current buyers market to demand the best. Malaysia, for instance, demanded upgrading of engines and avionics as a condition for purchasing MiG-29s,⁵¹ and got the Russians to agree. The UAE also demanded, in the clearest possible terms, that the U.S. reverse long-standing policies by offering AMRAAM air-to-air missiles on the F-15s McDonnell-Douglas and the F-16s Lockheed-Martin were proposing to meet the UAE's \$8 billion fighter requirement.⁵² UAE officials insisted that they would not even consider F-15s and F-16s without AMRAAM.⁵³ Eventually, the U.S. government agreed to this condition, despite strenuous objections from Israel.⁵⁴

In some cases, firms are designing and marketing very sophisticated products exclusively for the export market. Russia, for example, developed the TOR surface-to-air missile system exclusively for export after the Russian military showed no interest in the project. Likewise, a state-owned South African firm developed a low-observable shroud (called "FlowChart") for drones or cruise missiles—again strictly for export.

International arms shows are now displaying (and in most cases offering to sell) a pot-pourri of sophisticated technologies which would have been unthinkable five years ago. Selected examples of such "blockbuster" technologies include:

⁴⁹ Tony Capaccio, "Air Force OK'd To Sell Top Air-To-Air Missile To UAE, Israel," *Defense Week*, July 17, 1995, p. 1.

⁵⁰ *Ibid.*, p. 1.

⁵¹ Stephen Duthie and Jeff Cole, "Malaysia to Buy Russian MiGs, McDonnell Jets," *Wall Street Journal*, June 30, 1993, p. 10.

⁵² Capaccio, *op. cit.*, p. 1.

⁵³ Ezio Bonsignore, "AMRAAM Enters Middle East Market," *Military Technology*, Issue No. 7, 1995, p. 19.

⁵⁴ *Ibid.*, p. 19. Also, see Capaccio, *op. cit.*, p. 1.

- Several versions of reactive armor (by the Russians, Ukrainians, and several Eastern European nations)
- Satellite photography (by France, Russia, China, and the United States)
- Military surveillance satellites (by France)
- Airborne early warning aircraft (by the United States, Russia, and Israel)
- Airborne refueling aircraft (by the United States and Israel)
- Man-portable surface-to-air missiles (by Russia)
- Theater ballistic missile defense systems (by Russia, France, Israel, and the United States)
- Countermeasures to ballistic missile defenses (by Russia, possibly to be joined soon by China and North Korea)
- Low observable technologies (by France, South Africa, Russia, and the United States)
- RPVs and UAVs (by Israel, France, Russia, and the United States)
- Counter-stealth radars for detecting low observable aircraft (by Russia and the Czech Republic)
- Laser "dazzlers" (by Russia and China)
- Diesel electric submarines (by Russia, Germany, Sweden, Holland, France, and Australia)
- Cryptological equipment (by Russia)

Perhaps the best illustration of this trend toward releasing more and more sophisticated products lies in the area of low observable or stealth technologies. Between 1991 and 1994, the U.S. Department of Commerce granted 166 export licenses for stealth-related technologies.⁵⁵ Some of these technology transfers were benign; e.g., composite materials technology was released for the manufacture of high-priced golf clubs in East Asia. Others, however, had significant military implications. In one case, the Department of Commerce first approved (and then rescinded) permission to export a "high-performance, radar-absorbing coating" for a German cruise missile and for a "commercial satellite" of another unidentified allied nation.⁵⁶

⁵⁵ "Pentagon Wages War to Control Export Licenses," *Journal of Commerce*, September 18, 1995, p. 1.

⁵⁶ *Ibid.*

There are two significant aspects to the foregoing list of sophisticated technologies and systems now available in the international market place. One, all of these technologies were among the most closely guarded secrets of the would-be suppliers during the Cold War. Second, they are significant force multipliers which have tremendous strategic significance, even if only acquired in small numbers.

3. Upgrading Existing Systems

Instead of buying new equipment, many fiscally constrained nations are looking to modernize their existing inventories through upgrade packages.⁵⁷ Responding to such interest, marketing representatives at international arms shows stress that this option gives buyers increased combat capabilities and extended service life at very modest costs compared with procuring new equipment.

The greatest interest in upgrades seems to center on fighter aircraft, particularly Russian MiG-21s and U.S. F-5s. Industry sources estimate that of the 10,000 MiG-21s originally built by Russia, some 2,500 still have enough service life left in the airframes to make upgrading worthwhile.⁵⁸ In fact, a joint French-Russian consortium is now upgrading 125 to 150 Indian MiG-21s. Many of the 2,600 F-5s built by Northrop-Grumman are also considered prime candidates for service-life extension and capabilities improvement.⁵⁹

F-5s and MiG-21s are not the only candidates for modernization. Lockheed-Martin, for instance, is modernizing A-4M Skyhawks for Argentina, while several firms are seeking to upgrade maritime patrol aircraft.⁶⁰ Belgium, Denmark, the Netherlands, and Norway are also currently undergoing a \$1.85 billion mid-life upgrade of 301 F-16A/B fighters. Similarly, British Aerospace and Panavia are providing a \$1 billion mid-life upgrade program for 142 Tornado low-level strike aircraft.

Overall, aviation industry sources estimate that upgrading aircraft may be a \$3.75 to \$5 billion a year business opportunity—one many companies are eagerly pursuing.⁶¹ The potential

⁵⁷ "Upgrade Markets Promise Mega-Bucks for Industry," *National Defense*, March 1995, pp. 28-29.

⁵⁸ "MiG-21s Mean Upgrade Business in Many Parts of the World," *ShowNews*, Aviation Week Group, June 12, 1995, pp. 64-66.

⁵⁹ "Upgrade Markets Promise Mega-Bucks for Industry", op. cit., p. 28.

⁶⁰ John E. Woodruff, "Argentine Pact Goes To Lockheed," *Baltimore Sun*, June 14, 1995, p. 6. See also, Mark Hewish, "New Wine in Old Bottles: Upgrading Maritime-Patrol Aircraft," *International Defense Review*, No. 11, 1994, pp. 41-49.

⁶¹ "Upgrade Markets Promise Mega-Bucks for Industry," op. cit. p. 28. David Hughes, "Filling Key Gaps With New Alliances," *Aviation Week & Space Technology*, July 12, 1993, p. 53.

size of the market, coupled with the end of the Cold War, has produced some heretofore unimaginable commercial projects. American, Israeli, and Russian firms, for instance, are aggressively pushing one to four upgrade packages apiece for Russian MiG-21s. At the same time, the French put FLIR's on Russian-built BMP-3 infantry fighting vehicles to clinch a sale to the UAE. Ukraine and Belgium are cooperating to export an improved T-72 tank engine which produces 25% more horsepower. Similarly, South Africa is teaming with Poland to improve the fire control of T-72 tanks.

This South African-Polish T-72 project illustrates how nations can significantly increase the performance of in-service equipment through upgrade packages. The Tiger Fire Control System being jointly marketed by Poland and South Africa claims to improve the day and night fighting capability of a T-72 tank dramatically while extending its operational life another 10 to 15 years.⁶² According to the distributors' claims, the Tiger Fire Control System will:

- Improve the first round hit probability of 90% at 2,000 meters in static situations and 75% while on the move.
- Shorten reaction time between target detection and firing.
- Enhance target detection/identification capabilities both at night and during the day.
- Improved battlefield surveillance.
- Permit the rapid detection of subsystem malfunctions, thereby reducing down time.⁶³

Overall, Tiger marketing representatives claim that it gives the T-72 about 85% of the fire control capability of U.S. M1 and British Challenger main battle tanks at a much lower cost.

Planned upgrades for MiG-21s are also expected to result in significantly improved performance. Russian upgrades to Indian MiG-21s are expected to yield an eightfold increase in air-to-air capabilities and a fourfold improvement in the plane's ability to attack ground targets according to Indian aircraft industry experts.⁶⁴

Cost is one of the main selling points of upgrade packages, or as a headline in the 1995 Paris Air Show daily put it: "Upgrades Are All The Rage As Military Seeks More Bang For the Buck."⁶⁵ Savings by going the upgrade route can, indeed, be significant. The price tag on an

⁶² Christopher F. Foss, "Tiger FCS Unleashed For T-72s," *Jane's Defence Weekly*, February 4, 1995, p. 40.

⁶³ Ibid., p. 40.

⁶⁴ Vivek Raghuvanshi, "India Tightens Russian Ties As Carrier Talks Continue," *Defense News*, July 17-23, 1995, p. 14.

⁶⁵ "Upgrades Are All The Rage As Military Seeks More Bang For The Buck," *ShowNews*, Aviation Week Group, June 11, 1995, p. 60.

upgraded fighter, for example, can be as little as 20% of the cost of a new aircraft.⁶⁶ The cumulative impact of such per aircraft savings can be significant, even to the point of being deal breakers. The Czech Air Force, for example, wanted to buy a 24-plane squadron of American F-16s. Instead, the Czechs chose to upgrade 24 of their existing MiG-21s thereby saving \$630 million.⁶⁷

Although the idea of such upgrades is not new, they have acquired a new and growing importance in the international conventional arms market over the last couple of years. Low to middle ranking military powers like Jordan, Argentina, Romania, the Philippines, and the Czech Republic all want to increase the effectiveness of their aging military inventories but lack the funds necessary to acquire top of the line new equipment. Thus, they have no other option than upgrades. A stagnant new production market is equally important to manufacturers. Indeed, upgrade sales may be the difference between survival and bankruptcy for many firms, especially in the aviation business, over the next 5 to 10 years. Consequently, this confluence of economic pressures on both manufacturers and customers should produce an ever more robust upgrades market for the foreseeable future.

4. Hybridizing Weapons

Closely related to the concept of upgrading is the idea of hybridizing weapons systems by combining the best of the East and the West. Indeed, the conventional arms market is coming to resemble the automobile customizing business. That is, a customer can acquire a weapons system built to his specific requirements by choosing a unique set of components and subsystems to fit out a generic airframe or armored vehicle chassis. The international market now makes it possible, for example, to buy a Russian airframe, equip it with American or British engines, then add Israeli avionics, and arm it with French munitions. The move to hybridization, especially with military aircraft, is not all that surprising given that this has long been the approach to fitting out civilian passenger aircraft for export.

The process of hybridization is already taking place. Thompson-CSF, a French firm, is now providing digital signal processing technology for insertion into Russian fighter radars. This combination highlights Russian strengths (producing high power radars) and overcomes a traditional Russian weakness (data processing). As already mentioned, the UAE combined French FLIRs with Russian infantry fighting vehicles. The Russians are also offering a mobile command

⁶⁶ Clifford Beal and Barbara Starr, "Fighter Upgrades: The Only Game In Town," *International Defense Review*, No. 6, 1993, p. 445.

⁶⁷ Brendan McNally, "Czechs: F-16 Is Too Costly," *Defense News*, March 6-12, 1995, p. 17.

vehicle called Bakal, which is specifically designed to control Russian, French, and U.S. surface-to-air missiles in one system. The Russians are also marketing electronic "black boxes" which allow the purchaser to fire Russian and Western tactical missiles off the same aircraft during a single sortie. Recent new reports also indicate the chief designer of the Russian Vympel Design Bureau has met three times with McDonnell Douglas representatives to discuss the possibility of installing Russian AA-11 ARCH air-to-air missiles on American F-15s and F/A-18s.⁶⁸

Opportunities to hybridize equipment are not confined to French-Russian initiatives. TAAS-Israel Industries, for example, showcased several different artillery-delivered submunitions in both NATO and Russian caliber rounds at the 1995 Paris Air Show. Earlier, two South African companies, ASERMA and REUTCH, revealed at the 1994 Farnborough Air Show that they had produced fuses for American-made cluster bombs then in the hands of Iran.

China's proposed next-generation F-10 fighter illustrates this process of mixing and matching technologies from multiple countries to achieve required levels of performance and to overcome domestic technological shortfalls. In this instance, Israel is helping with the avionics, Russia is supplying the engines, and China is providing the airframe.⁶⁹

Current Mikoyan efforts to develop a new generation jet trainer for domestic and international markets emulate the Chinese efforts with the F-10. In the case of the MiG-AT, Russian designers have turned to Daewoo and Hyndai of South Korea to build wings from composite materials, Sextant Avionique of France as the systems integrator for on-board avionics, Snecma and Turomeca also from France for engines, and the Italian firm of Aeomacchai as a co-developer.⁷⁰

5. Globalizing the Arms Industry

Defense firms are more frequently entering strategic, transnational business alliances for technical, financial, and competitive reasons.⁷¹ What had been a fairly common practice among

⁶⁸ David Hughes, "Russians Offer AA-11s to McDonnell Douglas," *Aviation Week & Space Technology*, September 4, 1995, p.25.

⁶⁹ Fulghum, op. cit., p. 26.

⁷⁰ "Multinational Links Proliferate in Jet Trainer Market," *International Defense Review*, No. 4, 1994, p. 19.

⁷¹ Hughes, op. cit., p. 53.

American and Western European defense firms since the 1980s is rapidly expanding to include East Asian nations, Third World partners, and elements of the former Soviet/Warsaw Pact military-industrial complex.⁷² These joint efforts run a wide spectrum of activities to include joint R&D, coproduction, and cooperative marketing of weapons systems.⁷³

Such globalization of the arms industry springs from a variety of complex and often interrelated economic, military, and political motives. These include:⁷⁴

- Sharing costs and reducing risks of developing and producing new systems. (In the words of the director of business development for TRW's Military Electronics and Avionics Group, "companies are trying not to reinvent the wheel."⁷⁵)
- Gaining access to innovative foreign technologies, one-of-a-kind systems, or unique R&D facilities.
- Achieving economies of scale.
- Developing and penetrating foreign markets which otherwise might be closed to the partners if acting individually.
- Enhancing military interoperability and increasing combat effectiveness among military allies.
- Fostering other types of international cooperation, such as political solidarity or economic integration.
- Exploiting unprecedented opportunities which resulted from the collapse of the Soviet bloc and the eroding of barriers that once foreclosed collaboration between Western and Eastern firms.

Press reports coming out of the 1995 Paris Air Show suggest that the FC-1 fighter program is a classic example both of hybridization and of international cooperation to meet an export requirement. In this case, China is the lead designer and systems integrator for producing a single-seat, multi-role fighter to meet a Pakistani Air Force Requirement. According to the Chinese Chief Project Manager, China will design the FC-1 with help from several foreign sources.⁷⁶ The present plan is for China to design the airframe with help from the Russian Mikoyan aircraft design bureau. A different Russian firm will provide the engine. Pakistan will then specify the radar,

⁷² Richard A. Bitzinger, *The Globalization of Arms Production: Defense Markets in Transition, the Defense Budget Project*, December 1993, p. i.

⁷³ Hughes, op. cit., p. 53.

⁷⁴ Bitzinger, op. cit., p. 5.

⁷⁵ Gary L. Kirchoff as quoted by Hughes, op. cit., p. 53.

⁷⁶ Charles Bickers, "Sino-Pakistan Fighter Set To Fly By 1997," *Jane's Defence Weekly*, June 17, 1995, p. 3.

avionics, and weapons packages its wants. (At present, one of the leading contenders to supply the avionics subsystems and the radar is allegedly GEC-Marconi— a British-owned company.)

International cooperative efforts are not confined exclusively to R&D and production efforts. Some firms, particularly those in Russia, are turning to foreigners to market their products as well. Some Russian firms, for example, have approached once-bitter enemies South Africa and Israel for assistance in marketing and advertising their arms abroad.⁷⁷ A French-German consortium also appears poised to sell active tank defense systems for the Russians in the export market. For similar reasons, Sweden turned to British Aerospace for help in marketing the Gripen fighter.

6. Growing Access to Technical Know-How

Sophisticated weapons test facilities and equipment are now available to foreign customers. South Africa, for example, is offering access to its Overberg [Weapons] Test Range.⁷⁸ South African officials are promoting the Overberg Range to Eastern European and Asian clients as a secure place to upgrade products for the international arms market.⁷⁹ Promoters also emphasize the range's location (far from international borders and sources of electronic pollution) as well as its low cost.

South Africa is not alone in opening major RDT&E facilities to foreigners. According to its Assistant Director for Foreign Relations, Russia's Central Aero-Hydrodynamics Institute (TsAGI) is receiving increasing patronage from China.⁸⁰ The Chinese are especially interested in using the institute's aerodynamic software programs to help them rebuild their own aeronautical capabilities back home. This same Russian institute is also helping South Korea design its own "mini-TsAGI."⁸¹

Another avenue for acquiring technical know-how is to hire the requisite foreign scientists and engineers directly. The International Atomic Energy Agency, for example, confirmed rumors that Iran approached former Soviet nuclear scientists in 1993.⁸² Allegedly, Iran was more successful in luring Indian, Pakistani, and North Korean nuclear specialists to Tehran.⁸³ Former

⁷⁷ Beeston, op. cit., p. 11.

⁷⁸ "Secret Range Conducts Stealth, Foreign Tests," *Aviation Week & Space Technology*, July 3, 1995, p. 59.

⁷⁹ Ibid., p. 59.

⁸⁰ Craig Covault, "Yeltsin to Review Russian Aerospace Plea," *Aviation Week & Space Technology*, May 24, 1993, p. 22.

⁸¹ Ibid., p. 22.

⁸² James Wyllie, "Iran—Quest for Security and Influence," *Jane's Intelligence Review*, July 1993, p. 313.

⁸³ Ibid., p. 313.

U.S. Ambassador to China, James Lilley, claims that 3,000 Russian defense scientists and engineers were recruited by China for salaries as high as \$2,000 per month plus housing, a car, and living expenses.⁸⁴ In addition, more than 1,000 Russian defense scientists and technicians reportedly visited China between 1991 and 1993. Of this group, 300 remained with long-term commitments.⁸⁵

North Korea too has attempted to lure Russian scientists to work in its missile program. On one occasion, North Korea tried unsuccessfully to entice 100 Russian rocket engineers to Pyongyang under the guise of official scientific exchanges. Russian intelligence officials claim that the real purpose was to modernize SCUD-C missiles. Another group of 36 scientists from the Makeev [submarine-launched ballistic] missile design bureau was stopped at Moscow's Sheremetyovo Airport en route to North Korea in late 1992.⁸⁶

More recently, the Iranian Academy of Sciences offered out-of-work Russian physicists with a defense background \$300 to \$500 per problem (plus a \$3,000 Compaq notebook computer) for each "theoretical physics" problem that they solved.⁸⁷ These problems related to various aspects of missile guidance and nuclear physics.

It is tempting to believe that that phenomenon of unemployed, itinerant weapons specialists selling their services overseas is confined to just Russia. History suggests that such a conviction is likely to be false, especially given the high levels of unemployment and the general desperation of ex-defense specialists in the West.⁸⁸ Gerald Bull, the brilliant Canadian ordnance expert, sold his talents to the Iraqis when he could not succeed in Britain. Similarly, German weapons specialists migrated all over the world after World War II. These historical examples suggest that Western scientists could follow the path of their Russian counterparts in future.

Sketchy recent news reports indicate the illicit flow of defense information may have already begun. According to the Fox News Network, the FBI is currently investigating "hundreds" of espionage cases.⁸⁹ Other unpublished sources claim that number of cases being pursued by the FBI may actually be as high as 1,500.

⁸⁴ John J. Fialka, "U.S. Fears China's Success in Skimming Cream of Weapons Experts from Russia," *Wall Street Journal*, October 14, 1993, p. 12.

⁸⁵ Lewis Young, "Russia's Arms Bazaar Reaches Out To Asia," *Armed Forces Journal*, September 1993, p. 48.

⁸⁶ *Ibid.*, p. 45.

⁸⁷ *Ibid.*, p. 45.

⁸⁸ For a particularly sobering account of the plight of laid-off American defense workers see David Beers, "The Crash of Blue Sky California," *Harper's*, July 1993, pp. 68-73.

⁸⁹ Fox News Network as quoted by Stephen V. Cole in "Espionage," *For Your Eyes Only*, Issue 376, August 21, 1995, p. 1.

Thanks to the electronic revolution, scientists no longer have to travel abroad to assist a foreign patron. In 1993, Russian defense laboratories and their Chinese counterparts were linked by an electronic e-mail system.⁹⁰ In another case, Russian defense specialists corresponded electronically with an individual in Pakistan about rocket engines.⁹¹ In the above case of the Iranian Academy of Sciences, it received the solutions to its "theoretical problems" directly via Internet.

7. Innovative Financing

Some firms are responding to the increasingly competitive market for new production by devising innovative approaches to financing deals. The Russians, in particular, are in the forefront of this trend.

The Russians, for example, are sometimes willing to accept a barter arrangement as partial payment for new orders. The Chinese financed up to 80% of their initial Su-27 fighter order by trading consumer goods.⁹² The Chinese again financed about half of their second Su-27 order with consumer goods.⁹³ About one quarter of Malaysia's \$650 million order for MiG-29s is being paid in palm oil.⁹⁴ Similarly, Iran has traded oil for an undisclosed percentage of its multibillion dollar arms purchases from Russia and has made a similar offer to Ukraine in return for spare parts.⁹⁵ (Russia, in turn, has resold this oil on the international spot market.)

The Russians are also offering to trade weapons for debt forgiveness. The Russian government, for example, brokered a deal whereby the Hungarians got new MiG-29s in exchange for canceling some portion of the debt that they owed for withdrawing Russian troops from Eastern Europe. Russia has also signed a deal to repay half of its \$100 million debt to Bulgaria by supplying spare parts to the Bulgarian Air Force. Russia also offered to trade 20 Mi-17 military helicopters to Thailand to help settle its \$65 million debt for rice purchases. Similarly, Ukraine has offered to send surplus weapons back to Russia in return for decreasing its debt for natural gas purchases.

⁹⁰ William C. Tripplett II, "Inside China's Scary New Military-Industrial Complex," *The Washington Post*, May 8, 1994, p. C3.

⁹¹ "Moonlighting by Modem in Russia," *op. cit.*, p. 45.

⁹² Pavel Felgengauer, "Weapons Exports Continue to Decrease. Official Figures for 1992 Announced," *Segodnya*, No. 33, July 13 1993, p. 3 as translated in JPRS-UMA-93-026, July 28, 1993, p. 39.

⁹³ "Made In China' Deal Is Forged for Su-27s," *Jane's Defence Weekly*, May 6, 1995, p. 3.

⁹⁴ Ben Webb, "Flying Blind," *New Statesman & Society*, June 24, 1994, p. 22.

⁹⁵ Kuzio, *op. cit.*, p. 66.

Sometimes, countries accept these weapons because they believe that it is the only way collecting some portion of what they see as a "bad debt." The South Korean government (over the objections its senior defense officials) accepted \$100 million worth of MiG-29s, S-300 surface-to-air missiles, and other state-of-the-art military goods in partial servicing of a growing \$650 million Russian debt.⁹⁶ According to South Korea's semi-official Yonhap News Agency, the government concluded that they had "no choice but to accept the offer" while Russia's foreign debt keeps rising.⁹⁷

Not all nations look on such offers as making the best of a bad situation. Germany's national audit office in 1993, for example, recommended the Defense Ministry accept Russia's offer of 100 MiG-29s in lieu of its debt payments.⁹⁸ The auditors believed that this approach had two advantages. First, it would offset some of Russia's hard-currency debt to Bonn. Second, acceptance of the MiG-29s would permit Germany to buy fewer of the very expensive EuroFighters. Such savings could be significant given that the EuroFighter will be nearly twice as expensive as the MiG-29s.⁹⁹

Economic offsets are also becoming an increasingly important tactic used by Western firms to secure foreign military orders. These can be either "direct" transactions whereby military technology is transferred to the recipient, typically in the form of a license to produce part of the product in-country. Offsets may also be "indirect." That is, the seller agrees to counter-import some random product into the arms-selling country, invest in local businesses, or transfer commercial technology.

The value of these offsets is usually significant to the recipient country, running 50% to 100% of the total purchase price and, in a few instances, more than 100%.¹⁰⁰ Northrop, for instance, agreed to do \$2 billion worth of business in Finland as part of a \$3 billion sale of aircraft.¹⁰¹ In competing to fulfill Britain's attack helicopter requirement, the German/French

⁹⁶ Don Kirk, "For S. Korea, Payment in Russian Weapons," *Long Island Newsday*, August 9, 1994, p. 19.

⁹⁷ *Ibid.*, p. 19.

⁹⁸ "Substitute MiGs for Some EuroFighters, German Auditors Tell Ruehe," *Aerospace Daily*, November 30, 1993, p. 334.

⁹⁹ Webb, *op. cit.*, p. 22.

¹⁰⁰ William D. Hartung, "The Phantom Profits of the War Trade," *The New York Times*, March 6, 1994, p. III-13. See also Douglas Barrie and Julian Moxon, "Apache Outruns the Tiger," *Flight International*, April 19, 1995, p. 27.

¹⁰¹ Hartung, *op. cit.*, p. III-13.

bidders and their American competitors both offered at least 100% offset packages.¹⁰² Earlier, rivalry between these same two competitors reached a point where the Eurocopter consortium offered the Dutch 120% in offsets.¹⁰³

There is considerable disagreement about the wisdom of this practice. Critics charge that it increases regional instability by promoting sales that would otherwise be beyond the financial reach of countries, decreases Western economic competitiveness in commercial markets by degrading the West's technological advantage in civilian markets, and delays defense conversion.¹⁰⁴ Defenders counter that offsets save jobs in the arms industry, add to the self-defense capabilities of recipients, preserve the domestic defense industrial base from extinction, and lower unit costs to domestic military forces through economies of scale and by amortizing R&D costs over larger production runs. While disagreement is fierce about the efficacy of offsets, both sides agree the practice is an increasingly common one.

8. Arms as a "Commodity"

Once arms transfers were seen primarily as tools of foreign policy whose primary value was political. As such, arms transfers during the Cold War were judged primarily from a national security perspective. This perception has changed radically, however, since the end of the Cold War. Increasingly, arms are coming to be seen in economic terms as just another commodity for international trade except when proposed sales are to "pariah" states or involve weapons of mass destruction. Indeed, it may soon reach a point where arms are treated in a like manner to automobiles and consumer electronics; i.e., as just one more important commodity in the perpetual struggle to gain a positive balance of trade.

Even in the case of "pariah" states there is some disagreement about the importance of political considerations over economic considerations. Dmitri Trenin of the Russian-American Commission on Conventional Arms Proliferation, for example, notes that many Russian arms makers "feel bitter" about the UN embargoes against Iran and Libya since the "only one suffering for this is Russia."¹⁰⁵ Officials with Roosvooruzheniye (the official Russian state company for export in-production conventional arms) and with various Russian arms makers also believe that

¹⁰² Carole A. Shifrin, "U.K. Helicopter Decision Looms," *Aviation Week & Space Technology*, July 10, 1995, p. 29.

¹⁰³ Barrie and Moxon, op. cit., p. 27.

¹⁰⁴ Lora Lumpe, "Sweet Deals, Stolen Jobs," *The Bulletin of the Atomic Scientists*, September/October 1994, pp. 30-36. See also Hartung, op. cit.

¹⁰⁵ Carol J. Williams, "A Rush to Arms Sales," *Los Angeles Times*, May 22, 1995, p. 2.

such embargoes against their foreign clients are a way for Western firms to squeeze them out of business. In the words of a spokesman for Roosvooruzheniye, "As the global arms market narrows, there is ever harsher competition."¹⁰⁶

Experience has shown Russian government officials that raw materials and military technology are about the only two "crops" for which substantial international demand exists for Russian products. What is more, some officials argue that the defense sector is the pinnacle of Russian science and technology. Hence, it will serve as the "locomotive" to propel the future recovery of the economy as a whole.¹⁰⁷ Other government officials say that arms exports are the only way for Russia to regain its independence from the humiliation of Western aid.¹⁰⁸

Secretary of Defense William Perry testified to the Senate Budget Committee in 1994 that, for the United States, "The dominant criterion for determining whether any weapons systems . . . are sold to a foreign government still is a national security decision, not an economic one."¹⁰⁹ Many, however, question that assertion.¹¹⁰

Regardless of whether national security is still the prime consideration, economics is becoming an increasingly important factor in U.S. arms transfer decisions. This process started under the Bush administration when Lawrence Eagleburger (then an Secretary of State) issued an internal memorandum ordering U.S. embassies to "get on board" in supporting U.S. arms exports.¹¹¹ At about the same time, the State Department's Office of Munitions Control, which in the past had thwarted many arms deals, was reorganized as the Center for Defense Trade.¹¹²

President Clinton continued to emphasize the economic aspects of arms transfer decisions and to promote exports. Newspaper accounts of Presidential Decision Directive 34 stated, for the first time, that the U.S. Government would explicitly consider the economic impact on the U.S. arms industry as one of the criteria for deciding whether to approve an export request.¹¹³ The

¹⁰⁶ Ibid., p. 2.

¹⁰⁷ Stephen Blank, "Crisis in the Russian Military Economy," *Jane's Intelligence Review Yearbook*, 1994, p. 37.

¹⁰⁸ Peter Adams, "Arms Firms Struggle to Survive," *Defense News*, October 3-9, 1994, p. 15.

¹⁰⁹ William J. Perry as quoted by Gilbert A. Lewthwaite, "Rise in U.S. Arms Exports Leads to Calls for Caution," *The Baltimore Sun*, May 30, 1994, p. 1.

¹¹⁰ Ibid., p. 1.

¹¹¹ Ralph Vartabedian and Tyler Marshall, "U.S. Defense Industry Heeds Call to Arms—By Foreigners," *Los Angeles Times*, November 30, 1993, p. C1.

¹¹² Ibid., p. C1.

¹¹³ Lora Lumpe, "Clinton's Conventional Arms Export Policy: So Little Change," *Arms Control Today*, May 1995, p. 9.

Clinton administration went even further later. An interagency team composed of representatives from the Departments of Commerce, State, and Treasury plus people from the National Security Council and the CIA got involved last year in helping Raytheon win a \$1.4 billion surveillance contract from Brazil.¹¹⁴ Ultimately, President Clinton himself importuned the Brazilian President in a personal letter on Raytheon's behalf.¹¹⁵ In the same vein, Secretary of Commerce Ron Brown actively stressed the importance of U.S. attendance at the 1993 and 1995 Paris Air Shows as well as industry participation at the 1993 and 1995 Moscow Air Shows.

The changing relative importance of security and economic considerations for the U.S. is perhaps best illustrated by the case of potential AMRAAM air-to-air missile availability to the UAE. As discussed before, the United State reversed long-standing security policy objections to selling top-of-the-line AMRAAM missiles to the UAE because of economic concerns about the competitiveness of American products in an upcoming \$8 billion UAE procurement.

Chinese weapons exports, traditionally motivated by ideological and political concerns, are also now being driven by economics. That is, Chinese weapons sales are now mainly a vehicle to access foreign technology and to acquire hard currency. In addition, Chinese officials see arms sales as a vehicle for financing the modernization of the People's Liberation Army.

Economic motives seem to underlie North Korea's exports as well. Indeed, self-financing military modernization via export sales may be the only way for North Korea's armed forces to reach their force capability goals.

Even ministries of defense are beginning to see arms sales in economic terms. In January 1992, the special commercial center was established alongside the Ukrainian Ministry of Defense to ensure that profits received from selling surplus military equipment would be used to improve the living conditions of service men as well as to assist joint enterprises for demobilized officers.¹¹⁶ In the long term, the Ukrainian Ministry of Defense plans to establish a special bank to facilitate the sale of surplus equipment. Earlier a similar center was created and attached to the former Carpathian Military District.¹¹⁷ In the latter case, the center has already negotiated a deal with a German company to sell military property and bases. Additionally, the Carpathian center has also sold outdated military equipment, weapons, and precious metals.

¹¹⁴ Michael Hirsh and Karen Breslau, "Closing the Deal," *Newsweek*, March 6, 1995, p. 34.

¹¹⁵ *Ibid.*, p. 34.

¹¹⁶ Kuzio, *op. cit.*, p. 65.

¹¹⁷ *Ibid.*, p. 65.

9. Growing Importance of Black and Grey Market Sales

Black and grey arms market sales are becoming increasingly important sources of weapons which are not available from overt sources and for "pariah" states which are embargoed by one or more international organizations. Indeed, Iran and Iraq both went to elaborate lengths to establish clandestine buying and shipping networks to take advantage of black and grey market opportunities.¹¹⁸ Such sales run the gamut from assault rifles and grenades up to technologies capable of producing weapons of mass destruction.

Like overt arms sales, clandestine sales have both lean and fat years. But recently, covert sales seem to have been at least holding their own and perhaps even expanding. It is difficult to get accurate estimates on the size of the black and grey markets for any particular year. Nevertheless, "best guess" estimates suggest that the overall dollar volume of illegal sales can range from as little as \$1 to \$2 billion in down years up to \$5 to \$10 billion in good years.¹¹⁹ In any given year, a few countries may be the primary recipients of a large portion of total sales. Analysts, for example, estimate that perhaps as much as \$2 billion worth of arms were pumped into Bosnia alone in 1993 despite the UN embargo.¹²⁰

For some nations, black and grey market sales make a major contribution to overall profitability and/or survival of domestic arms producers. In 1992, for instance, then-Vice President of Russia Alexander Rutskoi claimed that "illegal commercial activity is flourishing" and "its scale is immeasurable."¹²¹ A year later, the Russian Ministry of Interior estimated that black market sales of Russian weapons were at least twice those of overt sales.¹²²

Motivations for selling in the black and grey markets are mixed. For some sellers, these channels offer the only means of corporate and (in some cases personal) economic survival in the turmoil brought about by the end of the Cold War. In other cases, officers illegally sell off equipment: (1) to feed and house their men, (2) to stave off poverty in an era of rapidly escalating inflation and stagnating salaries, and (3) to aid ethnic groups for which the military has sympathy. For some, simple greed is enough. Illegal weapons can fetch a premium of 30% to 50% over normal prices.¹²³ Still other firms (particularly in the former Soviet Union and Warsaw Pact) feel

¹¹⁸ Chris Hedges, "A Vast Smuggling Network Gets Advanced Arms to Iran," *New York Times*, March 15, 1995, p. 1. See also Douglas Jehl, "Who Armed Iraq? Answers the West Didn't Want to Hear," *New York Times*, July 189, 1993, p. E-5.

¹¹⁹ "The Covert Arms Trade," *The Economist*, February 19, 1994, p. 21.

¹²⁰ *Ibid.*, p. 21.

¹²¹ Jack Kelley, "Some Soldiers Sell Weapons To Buy Food," *USA Today*, May 21, 1993, p. 1.

¹²² *Ibid.*, p. 1.

¹²³ Peter Fuhrman, "Trading in Death," *Forbes*, May 10, 1993, p. 98.

frustrated that the embargoes are targeted almost exclusively at their former customers. Indeed, some have even come to see such embargoes as a plot by U.S. arms makers to drive them out of business.¹²⁴

Russia is one of the primary suppliers of clandestine military equipment and defense technologies. This year, for example, Roosvooruzheniye (the state corporation charged with centralizing and controlling the sale of new-production equipment) was accused of trading \$90 million worth of weapons without the proper licenses.¹²⁵

Potential Russian arms suppliers operate in an environment awash with general government corruption. According to a Russian Academy of Sciences analyst, "The black market has become one with the bureaucracy."¹²⁶ In 1991, the Soviet Ministry of Interior estimated that half the income of the average government functionary came from bribes and that four out of five agents working for the Ministry's militia (e.g., state police) were on the take.¹²⁷ Wide-scale bribery still persists. In the fourth quarter of 1994 alone, 1,500 instances of bribe-taking by regional government officials were uncovered in what Russian businessmen have come to term "the state racket".¹²⁸ Thus, bribery is rampant and chances of detection are slim.

This general pattern of corruption is mirrored in the arms supply business. For example, part of the investigation of Roosvooruzheniye this spring also uncovered that it was paying middlemen a 20% commission (i.e., bribes) on all trades and that these "commissions" totaled \$30 to \$35 million in 1994.¹²⁹ In an earlier case, Russian officials received \$75,000 in bribes to issue export certificates.¹³⁰ Indeed, corruptible government officials are one of the primary reasons for the large number of illegal Russian arms deals.

The collapse of the Soviet Union, a disappearing sense of mission, severe economic hardships, and lax internal controls have also resulted in a situation where "it is impossible to imagine the present scale of weapons thefts from the Army" in the words of one Russian journalist.¹³¹ Even the Russian Defense Minister has acknowledged in a letter to the Duma that the

¹²⁴ Williams, op. cit., p. 2.

¹²⁵ Chrystia Freeland and Dmitri Volkov, "Russia to Probe Arms Trading," *London Financial Times*, April 18, 1995, p. 2.

¹²⁶ Kelley, op. cit. p. 1.

¹²⁷ Claire Sterling, "Redfellas," *The New Republic*, April 11, 1994, p. 19.

¹²⁸ "Criminals Get Organized as Elections Approach," *Moscow Times*, August 19, 1995, p. 9.

¹²⁹ Freeland and Volkov, op. cit., p. 2.

¹³⁰ Kelley, op. cit., p. 1.

¹³¹ N. Sergeyev, "Plundered Arsenal: Why the Underground Arms Market is Prospering," *Sovetskaya Rossiya*, July 7, 1992, p. 4 as translated in JPRS-UMA-92-027, July 22, 1992, p. 24.

mass theft of weapons and ammunition was a prime problem.¹³² Wide-scale corruption and the breakdown of military controls permits officers to sell fuel, rations, equipment, and weapons regularly on the black market.¹³³ Some Russian soldiers even sold weapons and ammunition to their Chechen adversaries for a few bottles of vodka.¹³⁴

Even Russian military authorities have difficulty in quantifying the magnitude of this problem. Nevertheless, indications are that it is staggering in scope. One Russian newspaper speculated that a large explosion at the Russian Far Eastern fleet's arms depot was a deliberate attempt to conceal widespread theft of ammunition.¹³⁵ An inventory by the Ministry of Defense of the renegade 14th Army in Moldova could only locate 30% of the Army's allocated equipment. In the Caucasus Military District during the first quarter of 1992, 1,118 railroad cars (each carrying 20 tons of artillery ammunition) went missing.¹³⁶ Overall, the total amount of artillery ammunition stolen (read probably sold by base commanders) in the Caucasus equaled four times the British army's stored artillery ammunition.¹³⁷

Russia is not alone. The Bulgarian state arms export agency Kintex has a long record of black market activities. As early as 1989, Kintex was doing \$43 million in illicit business with Iraq.¹³⁸ In this particular instance, Kintex was supplying equipment to two Iraqi factories at the center of its nuclear weapons and ballistic missile programs. In 1992, a Portuguese arms trader approached Kintex with fake end-user certificates which were riddled with spelling and punctuation errors.¹³⁹ The plan was to divert several shipments of Bulgarian-made assault rifles, mortars, surface-to-air missiles, and large-caliber artillery shells allegedly going to the Bolivian Ministry of Defense to Croatian ports of call.¹⁴⁰ A year later, Kintex made about a dozen illegal deals worth about \$100 million to smuggle arms into the former Yugoslavia.¹⁴¹

¹³² Pavel Grachev as quoted in "The Threat That Was," *The Economist*, September 3, 1993, p. 18.

¹³³ Steven Merrit Miner, "From Hero to Heel, Russian Army Stuck in Trenches of Incompetence," *Los Angeles Times*, January 15, 1995, p. M2.

¹³⁴ Peter Ford, "Green Drunk, Corrupt: Russia's Troops Stumble," *The Christian Science Monitor*, February 21, 1995, p. 1.

¹³⁵ "Yeltsin Makes Admiral Walk the Plank," *Washington Times*, May 18, 1994, p. 12.

¹³⁶ "The Threat That Was," op. cit., p. 17.

¹³⁷ Ibid., p. 17.

¹³⁸ Fuhrman, op. cit., p. 96.

¹³⁹ Ibid., p. 96.

¹⁴⁰ Ibid., pp. 96-98.

¹⁴¹ Ibid., p. 96.

Spokesmen for Kintex showed an amazingly cavalier attitude about such black market activities when questioned by reporters. In response to questions about the diversion of the "Bolivian" shipment to Croatia, the General Director of Kintex replied that he had "no idea where the weapons went, and anyway it's not my problem."¹⁴² His alleged Portuguese partner was even blunter: "They don't give a shit about embargoes and will sell anywhere."¹⁴³

Ukraine too has reputed ties to the black market, especially to Iran. The Deputy Foreign Minister, for example, denies that Ukraine sold surface-to-surface missile to Iran, but has admitted that middlemen manage to ship Ukrainian arms, products, and technologies to states covered by embargoes.¹⁴⁴

Bolivia is also active as a conduit and front for illegal arms sales. In fact, at least one of Bolivia's major political parties has been tarred with accusations of assisting illegal arms traffickers.¹⁴⁵ More specifically, Bolivian political party officials were accused of providing diplomatic passports to three suspected arms traffickers. Additionally, Bolivian government officials were charged with supplying authentic Bolivian end-user certificates signed by non-existent military officers.¹⁴⁶

The problem of black and grey market sales is not confined to just the Third World, the former Soviet Union, and former members of the Warsaw Pact. The West too has been involved, especially with respect to so-called dual-use technologies. UN investigations after the Gulf War revealed that a total of 35 companies from Austria, Britain, Switzerland, West Germany, and the United States supplied significant material assistance to the Iraqi SCUD missile program.¹⁴⁷ More recently, the British government admitted that its export licensing procedures were so lax that three-quarters of the time it did not require British weapons manufacturers to declare the ultimate destination of their sales.¹⁴⁸ The head of a British cabinet-level department also admitted to Parliament that on one occasion licensing officers approved a sale even though British intelligence specifically warned them that the shipment was bound for Iran.¹⁴⁹

¹⁴² Anton Saldjiiski as quoted by Fuhman, op. cit., p. 98.

¹⁴³ Jose Saldanha as quoted by Fuhrman, op. cit., p. 98.

¹⁴⁴ Kuzio, op. cit., p. 65.

¹⁴⁵ Nathaniel C. Nash, "Arms Traffickers Use Latin Nations as Dodge," *New York Times*, September 2, 1993, p. 12.

¹⁴⁶ Ibid., p. 12.

¹⁴⁷ Jehl, op. cit., p. E-5.

¹⁴⁸ Barbash, op. cit., p. 16.

¹⁴⁹ Ibid., p. 16.

E. OVERALL CONCLUSIONS AND STRATEGIC IMPLICATIONS

It should be obvious from the foregoing discussion that the international arms market is in a state of flux regarding its organization and operational practices. These in-process changes are wide-spread in scope as well as radical and fundamental in nature. Indeed, the international arms market as we knew it during the past 40 plus years of the Cold War is essentially dead. Its replacement is still undergoing a metamorphosis. Nevertheless, it is clear that something very different in nature and character is beginning to appear.

For one thing, the market is undergoing a radical restructuring. In the near term, this means that weapons production of particular product lines will be concentrated into only one or two firms within a given nation. This process is likely to continue in the long term. Perhaps even reaching a point where there are only two to four suppliers of major end items like tanks and combat aircraft worldwide. Such radical consolidation, in turn, raises serious questions about the continued viability of equipment acquisition strategies which rely heavily on competition among would-be suppliers to hold down military procurement costs.

Downsizing defense work forces is an integral part of the restructuring process. Overall cuts of 50% to 60% from Cold War highs seem very probable. Political factors and exceedingly low wage rates at present may mitigate the severity of such cuts in places like the former Soviet Union and parts of Eastern Europe at least for the near term. As wages rise and defense industrialists lose their political clout, further work force reductions seem likely. For defense workers in the former Soviet Union and Eastern Europe, widespread and drastic layoffs are just a question of time.

The newly emerging international arms market also has a far different focus than the old one. Firms are increasingly emphasizing international considerations over domestic ones as in the past. Domestic orders will continue to be important, but will be increasingly eclipsed by the need to export in order for companies to survive. At the same time, domestic militaries will increasingly encourage exports to hold down per unit costs of next generation weapons systems they themselves wish to acquire.

This international focus has several important implications. First, it means that producers will increasingly design new systems to meet the requirements of the broadest possible segment of the international market, even if that means sometimes ignoring or compromising some specific requirements of their domestic military forces. Indeed, firms may increasingly design military products exclusively for export (as the Russians have already done with the TOR surface-to-air missile or as the Chinese are doing with the FC-1 fighter). Second, more transnational business

alliances will be formed for co-developing, co-producing, and co-marketing military products. Offshore production of military components may eventually become as commonplace as it already is today in consumer electronics, automobiles, and civilian passenger aircraft like the new Boeing 777. Third, pressures from the need to sell abroad and the increasing number of cross-border business ventures will further erode the effectiveness of conventional defense technology and arms transfer controls. If this last conclusion is correct, it probably means that controlling dual-use technologies will be virtually impossible in future.

The international arms market is increasingly driven by economic considerations. This means that the attitudes and practices of arms manufacturers may increasingly resemble those of their civil counterparts. Price, product reliability, and post-sale servicing of products therefore should assume ever greater importance. Indeed, some Japanese firms now believe that their reputation for turning out highly reliable, well-serviced civil products will someday translate into a significant competitive advantage which will allow them to expend into the international defense market. Economic considerations will also promote greater efforts to achieve operational efficiencies which, in turn, can be translated into competitive advantage in the marketplace.

Economic pressures, declining technology transfer controls, and more aggressive black marketing of defense products will ensure that increasingly sophisticated weapons will be available to potential customers, even to "pariah" states. Products like space surveillance photography, anti-tactical ballistic missiles, and low observable technologies were the most closely guarded secrets of the super powers five years ago. Today, they are being aggressively pushed at arms shows around the world to virtually anyone who can afford them.

The changing focus, structure, and practices of arms producers and developers have some positive military implications. Internationalizing production and designing to meet international requirements should increase equipment interoperability, an important consideration given the growing number of joint military operations in regional hot spots. The new economic emphasis (coupled with increasing export sales) should hold down unit costs and thereby make new and upgraded equipment more affordable to many states. This, in turn, should translate into greater regional security for Third World countries vis a vis their neighbors.

There are downside military consequences from these changes in the international arms market as well. For one thing, the technological advantage of American, European, and Russian military forces vis a vis potential regional adversaries is shrinking rapidly. This decline will translate into higher materiel losses and more casualties in future regional interventions. Transnational weapons design and production means more hybrid weapons will appear on regional battlefields. This, in turn, will greatly complicate the problem of identifying friend from foe and/or will increase "friendly fire" losses. Interoperability of weapons systems, particularly munitions,

will make it harder to deny potential adversaries essential materiel through embargoes. In addition to promoting greater regional security, more readily available high-tech, reasonably priced weapons may also spark dangerous regional arms races.

It is difficult to predict the full scope of the consequences that will result of the radical changes now sweeping the international arms market. It is clear, however, that the nature of international arms market of tomorrow will be far different from the one of the Cold War years.

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE March 1996		3. REPORT TYPE AND DATES COVERED Final
4. TITLE AND SUBTITLE The Changing Nature of the International Arms Market			5. FUNDING NUMBERS Central Research Program	
6. AUTHOR(S) Andrew W. Hull, David R. Markov				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Institute for Defense Analyses 1801 N. Beauregard Street Alexandria, VA 22311-1772			8. PERFORMING ORGANIZATION REPORT NUMBER IDA Paper P-3122	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Institute for Defense Analyses 1801 N. Beauregard Street Alexandria, VA 22311-1772			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Distribution approved for public release; distribution unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This paper assesses how the post-Cold War international arms market is changing in revolutionary ways. It begins by describing the impetus for many of the in-progress structural and operational changes now sweeping the international arms market. Next, it identifies and describes some emerging trends that spring from the changing context within which weapons exporters operate. Finally, it explores the strategic implications of some of these developments for the future development, production, and operation of weapons.				
14. SUBJECT TERMS arms industry, weapons, international arms market			15. NUMBER OF PAGES 38	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT SAR	